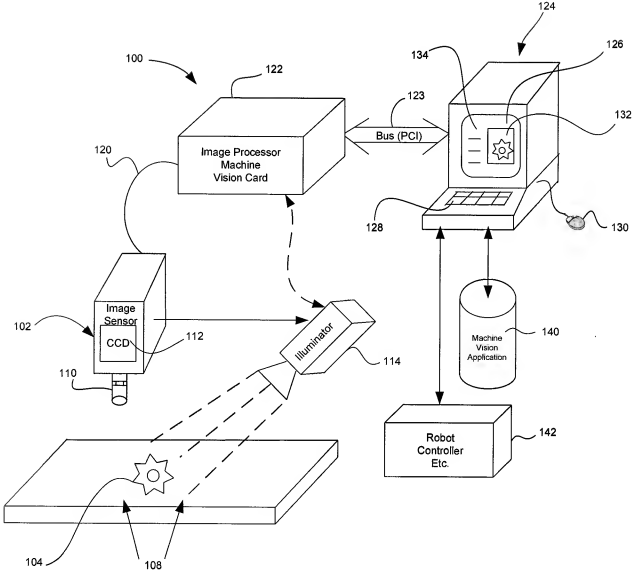

Fig. 1 (Prior Art)

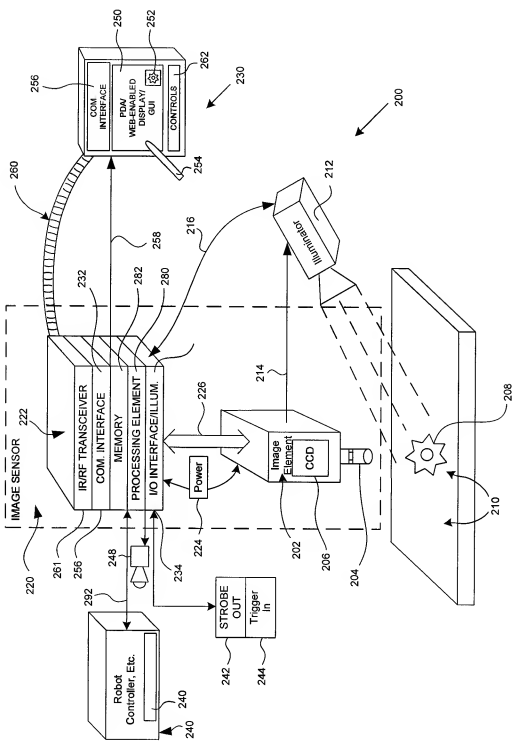
200
230
250
252
262
256
COM. INTERFACE
PDA/ WEB-ENABLED DISPLAY/ GUI
CONTROLS
254
260
258
216
212
illuminator
232
282
280
214
226
IMAGE SENSOR
222
IR/RF TRANSCEIVER
COM. INTERFACE
MEMORY
PROCESSING ELEMENT
I/O INTERFACE/ILLUM.
Power
Image Element
CCD
208
210
220
261
256
248
234
224
202
206
204
292
STROBE OUT
Trigger In
242
244
Robot Controller, Etc.
240
240

Fig. 2

220
222
FROM FIELD OF VIEW
OPTICS
204
IMAGE ELEMENT
202
PROCESSING ELEMENT
280
MEMORY
282
WORKING MEMORY
286
PROGRAM MEMORY
284
MVS SOFTWARE
400
CONFIGURATION MEMORY
288
OPTIONAL ILLUMINATION
212
TO WORK AREA
I/O INTERFACE
234
STROBE OUT
TRIGGER IN
COMMUNICATIONS INTERFACE
232
IR/RF INTERFACE/ DRIVERS
310
WIRED (SERIAL) INTERFACE/ DRIVERS
320
TO/FROM PDA OR WEB-ENABLED DEVICE
TO/FROM PDA OR WEB-ENABLED DEVICE

Fig. 3

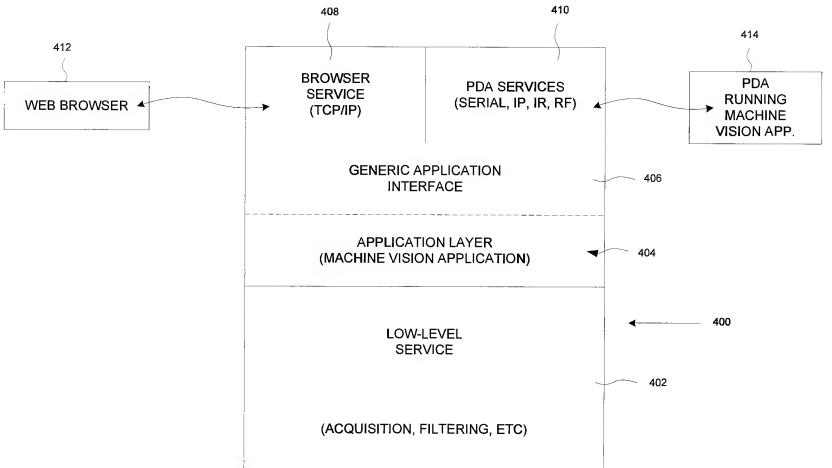
408
410
412
414
BROWSER SERVICE (TCP/IP)
PDA SERVICES (SERIAL, IP, IR, RF)
WEB BROWSER
PDA RUNNING MACHINE VISION APP.
GENERIC APPLICATION INTERFACE
406
APPLICATION LAYER (MACHINE VISION APPLICATION)
404
400
LOW-LEVEL SERVICE
402
(ACQUISITION, FILTERING, ETC)

Fig. 4

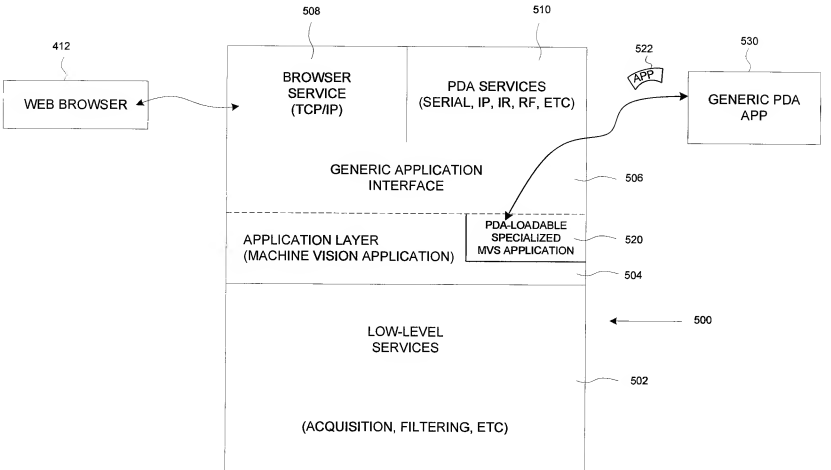
508
510
412
522
530
WEB BROWSER
BROWSER SERVICE (TCP/IP)
PDA SERVICES (SERIAL, IP, IR, RF, ETC)
APP
GENERIC PDA APP
GENERIC APPLICATION INTERFACE
506
APPLICATION LAYER (MACHINE VISION APPLICATION)
PDA-LOADABLE SPECIALIZED MVS APPLICATION
520
504
500
LOW-LEVEL SERVICES
502
(ACQUISITION, FILTERING, ETC)

Fig. 5

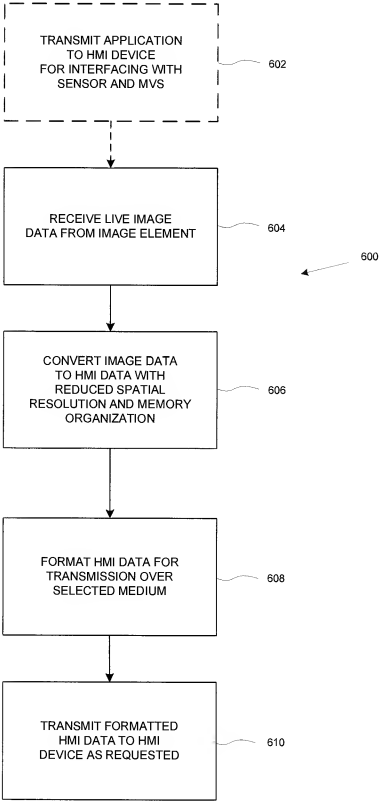
TRANSMIT APPLICATION TO HMI DEVICE FOR INTERFACING WITH SENSOR AND MVS
602
RECEIVE LIVE IMAGE DATA FROM IMAGE ELEMENT
604
600
CONVERT IMAGE DATA TO HMI DATA WITH REDUCED SPATIAL RESOLUTION AND MEMORY ORGANIZATION
606
FORMAT HMI DATA FOR TRANSMISSION OVER SELECTED MEDIUM
608
TRANSMIT FORMATTED HMI DATA TO HMI DEVICE AS REQUESTED
610

Fig. 6

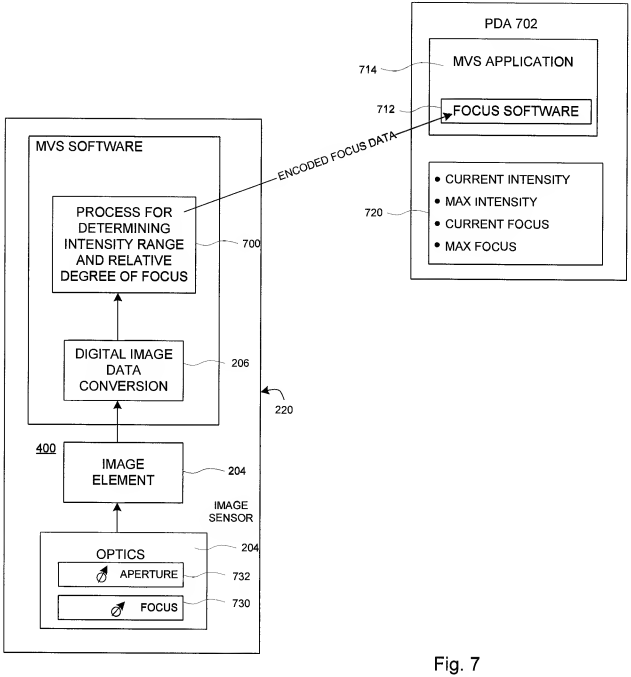
PDA 702
MVS APPLICATION
714
712
FOCUS SOFTWARE
ENCODED FOCUS DATA
• CURRENT INTENSITY
• MAX INTENSITY
• CURRENT FOCUS
• MAX FOCUS
720
MVS SOFTWARE
PROCESS FOR DETERMINING INTENSITY RANGE AND RELATIVE DEGREE OF FOCUS
700
DIGITAL IMAGE DATA CONVERSION
206
220
400
IMAGE ELEMENT
204
IMAGE SENSOR
OPTICS
204
APERTURE
732
FOCUS
730

Fig. 7

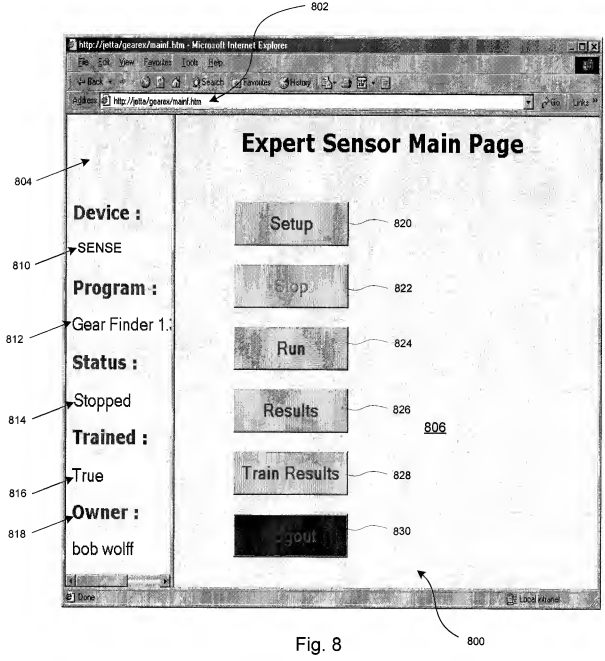
802
http://jetta/gearex/maint.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://jetta/gearex/maint.htm
Expert Sensor Main Page
804
Device :
SENSE
810
Program :
Gear Finder 1.
812
Status :
Stopped
814
Trained :
True
816
Owner :
818
bob wolff
Setup
820
Stop
822
Run
824
Results
826
806
Train Results
828
Logout
830
Done
Local intranet
800

Fig. 8

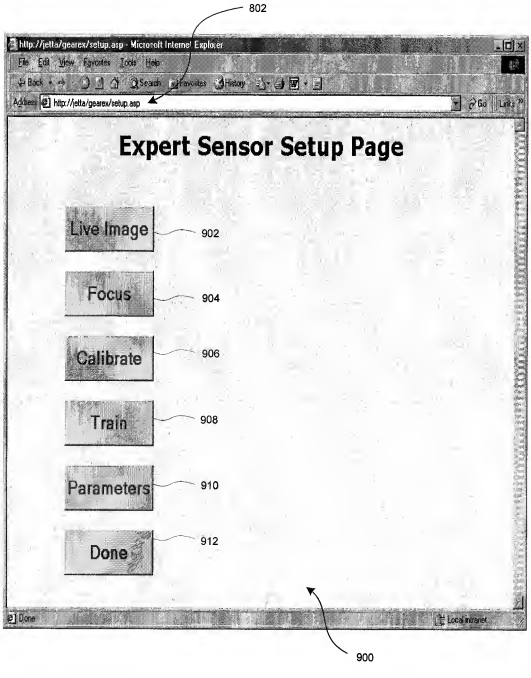
802
http://jetta/gearex/setup.asp - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://jetta/gearex/setup.asp
Go Links
Expert Sensor Setup Page
Live Image
902
Focus
904
Calibrate
906
Train
908
Parameters
910
Done
912
Done
Local intranet
900

Fig. 9

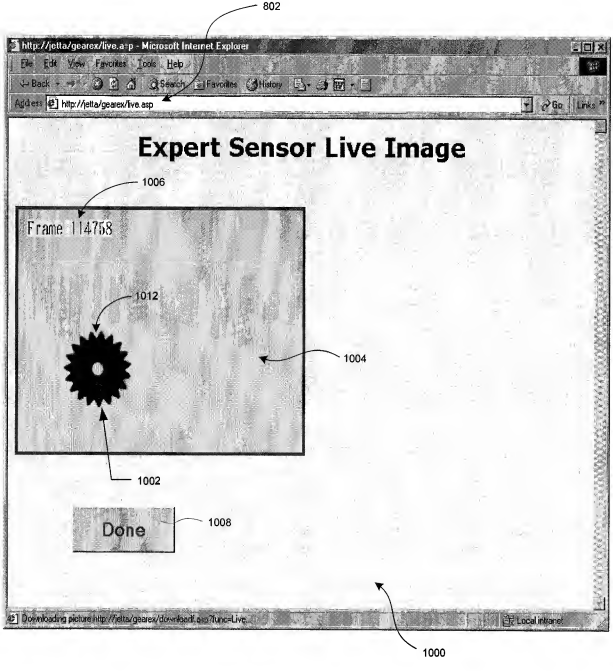
802
http://jetta/gearex/live.asp - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://jetta/gearex/live.asp
Go Links
Expert Sensor Live Image
1006
Frame 114758
1012
1004
1002
Done
1008
Downloading picture http://jetta/gearex/download.asp?Type=Live
Local intranet
1000

Fig. 10

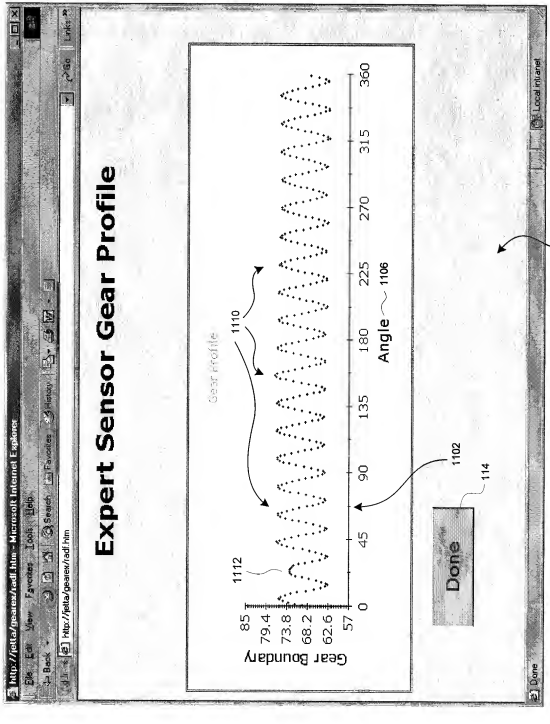
Expert Sensor Gear Profile
Gear Profile
Gear Boundary
85
79.4
73.8
68.2
62.6
57
0
45
90
135
180
225
270
315
360
Angle
1106
1110
1112
Done
1102
114
1100

Fig. 11

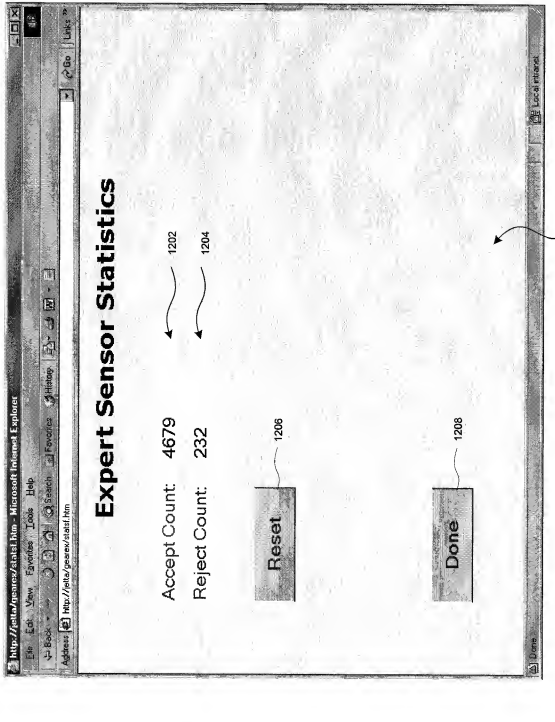
Expert Sensor Statistics
Accept Count: 4679
Reject Count: 232
Reset
Done
1202
1204
1206
1208
1200

Fig. 12

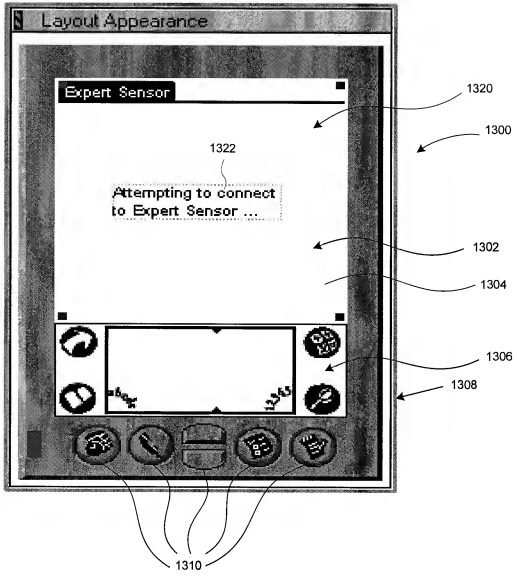
Layout Appearance
Expert Sensor
1320
1300
1322
Attempting to connect to Expert Sensor ...
1302
1304
1306
1308
1310

Fig. 13

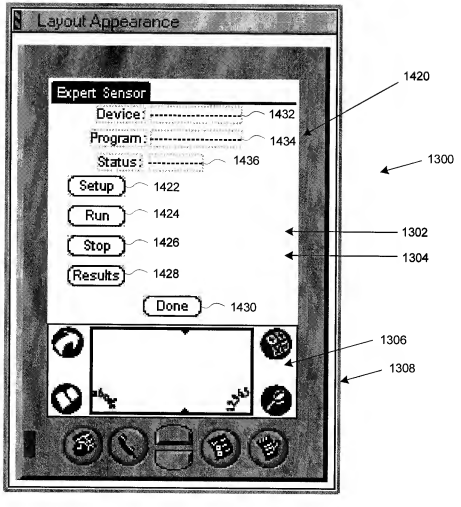
Layout Appearance
Expert Sensor
Device:
Program:
Status:
Setup
Run
Stop
Results
Done
1420
1432
1434
1436
1422
1424
1426
1428
1430
1300
1302
1304
1306
1308

Fig. 14

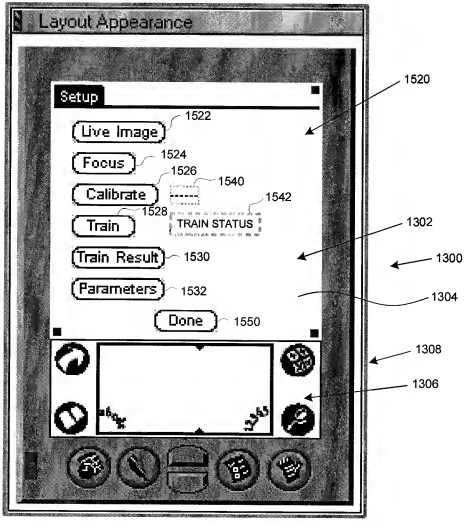
Layout Appearance
Setup
Live Image
Focus
Calibrate
Train
Train Result
Parameters
Done
TRAIN STATUS
1520
1522
1524
1526
1528
1530
1532
1540
1542
1550
1302
1300
1304
1308
1306

Fig. 15

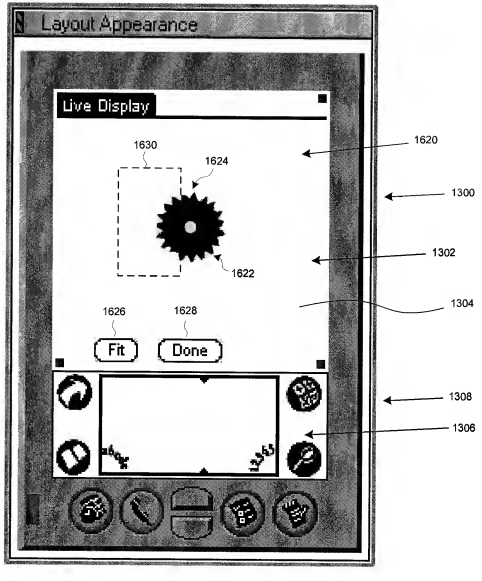
Layout Appearance
Live Display
1630
1624
1620
1300
1622
1302
1304
1626
1628
Fit
Done
1308
1306

Fig. 16

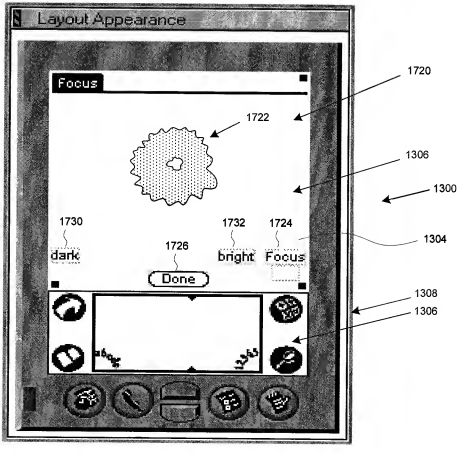
Layout Appearance
Focus
1720
1722
1306
1300
1730
1732
1724
1304
dark
1726
bright
Focus
Done
1308
1306

Fig. 17

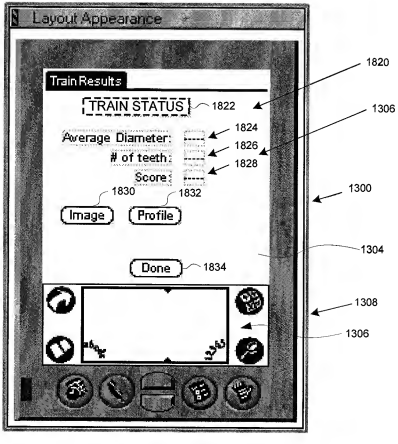
Layout Appearance
Train Results
TRAIN STATUS
1822
Average Diameter:
1824
# of teeth:
1826
Score:
1828
1830
1832
Image
Profile
Done
1834
1820
1306
1300
1304
1308
1306

Fig. 18

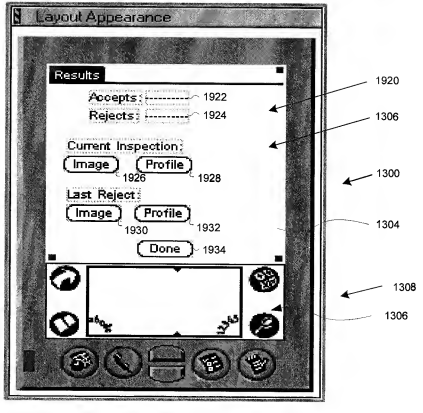
Layout Appearance
Results
Accepts:
Rejects:
Current Inspection:
Image
Profile
Last Reject:
Image
Profile
Done
1920
1922
1924
1306
1926
1928
1300
1930
1932
1304
1934
1308
1306

Fig. 19